HR: 11:05h
AN: P51C-08 INVITED
TI: The Gravity Field and Internal Structure of **Io**
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AB: Using radio Doppler data from the Galileo spacecraft's I24 and I25 flybys of **Io**, we will update **Io**'s gravity field and interior models. Previous results were obtained from the **Io** flyby on 7 December 1995 prior to Jupiter orbital insertion (**Anderson**, Sjogren, and Schubert, {\it Science} {\bf 272}, 709-712). Because of communication constraints, the Doppler data were referenced to the spacecraft's crystal oscillator, a device substantially affected by inherent frequency drift and by Jovian radiation. On the other hand, the spacecraft radio system at I24 and I25 should be phase locked to an uplink radio carrier referenced to atomic frequency standards at stations of the Deep Space Network (DSN). The instrument noise should not be a problem, especially at the Fourier frequencies of importance to the gravity determination ($\sim$ 10^{-4} to 10^{-2} Hz). I24 is a near equatorial pass at a closest approach altitude of about 500 km, while I25 passes near the south pole at an altitude of about 300 km. Consequently, it might be possible to measure separately the steady-state gravity components caused by both **Io**'s rotational response and its tidal response, and to test the assumption of hydrostatic equilibrium. Previously, for the single equatorial pass at an altitude of about 890 km, it was necessary to impose an a-priori hydrostatic equilibrium constraint on the Doppler fitting model. This work was sponsored by the Galileo Project and was performed at the Jet Propulsion Laboratory, California Institute of Technology, under contract with NASA. G.S. and W.B.M. acknowledge support by grants from NASA through the Galileo Project at JPL and the Planetary Geology and Geophysics program.
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